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SHORTER NOTES

***Marsilea quadrifolia* and *M. vestita* in the Floras of Kansas and Missouri.**—In the fern floras of both Kansas and Missouri two species of water-clover ferns, *Marsilea*, have been recognized: a native species, *Marsilea vestita* Hook. & Grev., and the introduced Eurasian *M. quadrifolia* L. *M. vestita* is common in central and western Kansas, while *M. quadrifolia* has been reported from only two counties in the southeastern part of the state (Petrik-Ott, *Nova Hedwigia Beih.* 61:1-332, 1979). In Missouri, both species have been reported from a single county each: *M. vestita* (as the synonym *M. mucronata* A. Braun) from Barton County in southwestern Missouri and *M. quadrifolia* from Platte County in northwestern Missouri (Steyermark, *Flora of Missouri*, Iowa State University Press, Ames, 1963). On the basis of specimens known at present, however, *Marsilea quadrifolia* should be deleted from the flora of Kansas and *M. vestita* should be deleted from the flora of Missouri. The latter is particularly of note as this species has been listed as endangered in Missouri.

Petrik-Ott (op. cit.) reported *M. quadrifolia* from Kansas on the basis of two specimens, both from the herbarium of the University of Kansas (KANU): *Kolstad & Harms 1581* from Cherokee Co., and *Holland 1993* from Neosho Co. The reasons for this are unclear as both sheets are annotated as *M. vestita* by Petrik-Ott, and the only mention of *M. quadrifolia* on either sheet is on the original label of *Holland 1993*. An additional specimen (*Harms 1137*, KANU) from Cherokee Co. was not cited by Petrik-Ott but was annotated by her as *M. quadrifolia*; this specimen has characters of sporocarp pedicel length (7 mm), position of attachment of this pedicel (4 mm above the petiole base), and glabrate sporocarps that are characteristic of *M. quadrifolia*. The specimen also has, however, asymmetrical abaxially hairy leaflets that are longer than wide and have concave inner margins and slightly crenulate terminal margins. In addition, the rhizomes are 1.0 mm or less thick and lack roots in the internodes. These are all characters of *M. vestita*, which normally has short-pedicelled (2-3 mm), basally attached hairy sporocarps.

The long sporocarp pedicel attached above the petiole base and the glabrous sporocarps in this plant are perhaps due to the development of the sporocarp under water, which has been shown to modify pedicel length and sporocarp indument (Bhardwaja, *Trop. Ecol.* 8:17-21, 1967). Sporocarps are normally produced only when these amphibious plants are emerged and dry, but occasionally the sporocarps develop under shallow water. In such instances the pedicel is attenuated and both the pedicel and sporocarp are almost glabrous. If the petiole is also attenuated, the pedicel, which is in fact a portion of that same leaf rather than the petiole of a separate leaf, may appear above the base of the petiole rather than at the base.

In Missouri, *Marsilea quadrifolia* was reported from Platte Co. by Gier (*Amer. Fern J.* 45:64-65, 1955) and was recollected there by Dunlap in 1962 (specimen in SMS). Steyermark (op. cit.) reported *M. vestita* from 1.5 miles north of Milford, Barton Co., on the basis of *Palmer 53101*. While I have not seen this particular specimen, I have seen others from the same locality: *Palmer 54495* (MICH), *Palmer 53949* (GH, KANU), *Dunlap s.n.* in 1961 (NLU, SMS), and *Dunlap s.n.* in 1963 (SMS). Of these, *Palmer 54495* and the Dunlap specimen from 1961 at NLU are fertile. Both bear the paired or triple (occasionally single) long-stalked sporocarps attached above the petiole base that characterize *M. quadrifolia*; in addition both these specimens and the sterile ones have symmetrical glabrous leaflets as wide as long or wider, with convex or straight inner margins and entire terminal margins, and rhizomes 1.0-1.3 mm thick bearing internodal roots, further confirming this identification.

A specimen of *Marsilea* from yet a third locality in Missouri was included among specimens sent from SMS: Boone Co., Watkins pond southwest of Midway, 12 June 1963, *Dunlap s.n.* Although this specimen is of a sterile, floating-leaved form, in which both species would have glabrous symmetrical entire-margined leaflets on long flexuous petioles, its stouter rhizomes and internodal roots indicate that it is also *M. quadrifolia*.

The criteria presented by Petrik-Ott (op. cit.) for distinguishing the two species are fairly reliable as long as adequate fertile material and leaves formed on land are present in a collection; the additional characters mentioned here are supplementary ones that can be used with scanty fertile or even sterile material, regardless of whether it grew on land or in water. Caution should be exercised in applying these characters outside the Great Plains region, however, as some of them, e.g., internodal roots, are found in extralimital species as well.

Marsilea quadrifolia appears to be spreading westward from northeastern North America, and collectors should continue to seek it both from additional localities in Missouri and from Kansas. *M. vestita*, although it is not expanding its range, is probably locally dispersed by migrating waterbirds and may eventually thus be brought into Missouri from nearby stations in eastern Kansas and Nebraska.

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